SECTION 23 72 00

AIR-TO-AIR ENERGY RECOVERY EQUIPMENT (Reissued AD-1)

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section specifies air to air -to-air plate heat exchanger.

1.2 RELATED WORK

A. Section 01 00 00, GENERAL REQUIREMENTS: Requirements for pre-test of equipment.

B. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Seismic requirements for non-structural equipment.

C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION: General mechanical requirements and items, which are common to more than one section of Division 23.

D. Section 23 21 23, HYDRONIC PUMPS and Section 23 22 23, STEAM CONDENSATE PUMPS: Requirements for pumping equipment.

E. Section 23 07 11, HVAC, PLUMBING, AND BOILER PLANT INSULATION: Requirements for piping insulation.

F. Section 23 21 13, HYDRONIC PIPING and Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING: Requirements for piping for expansion tanks.

G. Section 23 82 16, AIR COILS: Requirements for run-around system coils.

H. Section 23 31 00, HVAC DUCTS AND CASINGS: Requirements for sheet metal ducts and fittings.

I. Section 23 40 00, HVAC AIR CLEANING DEVICES: Requirements for filters used before heat recovery coils.

J. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC: Requirements for controls and instrumentation.

K. Section 23 05 93, TESTING, ADJUSTING AND BALANCING FOR HVAC: Requirements for testing, adjusting and balancing of HVAC system.

1.3 QUALITY ASSURANCE

A. Refer to GENERAL CONDITIONS.

B. Refer to specification Section 01 00 00, GENERAL REQUIREMENTS for performance tests and instructions to VA personnel.

C. Refer to paragraph QUALITY ASSURANCE in specification Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

D. Performance Criteria: Heat recovery equipment shall be provided by a manufacturer who has been manufacturing such equipment and the equipment has a good track record for at least 5 years.

E. Performance Test: In accordance with PART 3.

F. Warranty: The ERV core shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of ten years from the date of purchase. The balance-of-unit shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of two years from the date of purchase.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:
   1. Enthalpy Plate Heat Exchanger

C. Certificate: Submit, simultaneously with shop drawings, an evidence of satisfactory service of the equipment on three similar installations.

D. Submit type, size, arrangement and performance details. Present application ratings in the form of tables, charts or curves.

E. Provide installation, operating and maintenance instructions, in accordance with Article, INSTRUCTIONS, in Section 01 00 00, GENERAL REQUIREMENTS.

1.5 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. Air Conditioning and Refrigeration Institute (ARI)

ARI 1060-2005	Performance Rating of Air-to-Air Heat Exchangers for Energy Recovery Ventilation Heat Equipment

C. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE):

15-07	Safety Standard for Refrigeration Systems (ANSI)
52.1-92	Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter
52.2-07	Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
84-91	Method of Testing Air-to-Air Heat Exchangers

D. American Society for Testing and materials (ASTM)

D635-06	Standard Test Method for Rate of Burning and/ or Extent and Time of Burning of Plastics in a Horizontal Position
E84-07	Standard Test Method for Surface Burning Characteristics of Building Materials

E. Underwriters Laboratories, Inc (UL)

1812-95 (Rev. 2006) Standard for Ducted Heat Recovery Ventilators
Manufacturer shall be able to provide evidence of independent testing of the core by Underwriters Laboratory (UL), verifying a maximum flame spread index (FSI) of 25 and a maximum smoke developed index (SDI) of 50 thereby meeting NFPA 90A and NFPA 90B requirements for materials in a compartment handling air intended for circulation through a duct system. The method of test shall be UL Standard 723.

PART 2 - PRODUCTS

2.1 AIR-TO-AIR PLATE HEAT EXCHANGER

A. Comply with UL Standards.

B. The ERV core shall perform without condensing or frosting under normal operating conditions (defined as outside temperatures above -10°F and inside relative humidity below 40%). Occasional more extreme conditions shall not affect the usual function, performance or durability of the core. No condensate drains will be allowed.

C. The ERV core shall perform without condensing or frosting under normal operating conditions (defined as outside temperatures above -10°F and inside relative humidity below 40%). Occasional more extreme conditions shall not affect the usual function, performance or durability of the core. No condensate drains will be allowed.

D. Unit shall have the capacity to operate continuously without the need for bypass, recirculation, pre-heaters or defrost cycles under normal operating conditions.

E. Water vapor transfer shall be through molecular transport by hydroscopic resin and shall not be accomplished by “porous plate” mechanisms. Exhaust and fresh airstreams shall travel at all times in separate passages, and airstreams shall not mix.

F. Airflow through the ERV core shall be laminar over the products entire operating airflow range, avoiding deposition of particulates on the interior of the energy exchange plate material.

G. The unit case shall be constructed of G90 galvanized, 20-gauge steel, with lapped corners and zinc plated screw fasteners.

H. No condensate drain pans or drains shall be allowed and unit shall be capable of operating in both winter and summer conditions without generating condensate.

I. The ERV cores shall be protected by a MERV-8 rated, 2” nominal, pleated, disposable filter in both airstreams.

J. Access doors shall provide easy access to blowers, ERV cores, and filters. Doors shall have an airtight compression seal using closed cell foam gaskets. Pressure taps, with captive plugs, shall be provided allowing cross-core pressure measurement allowing for accurate airflow measurement.

K. Case walls and doors shall be insulated with 1 inch, 4 pound density, foil/scrim faced, high-density fiberglass board insulation, providing a cleanable surface and eliminating the possibility of exposing the fresh air to glass fibers, and with minimum R-value of 4.3 (hr·ft2·°F/BTU).

L. Unit shall have single-point power connection and a single-point 24 VAC contactor control connection. The unit electrical box shall include a factory installed, non-fused disconnect switch and a 24 VAC, Class II transformer/relay package.

M. Blower motors shall be Premium Efficiency, EISA compliant for energy efficiency. The blower motors shall be totally enclosed (TEFC) and be shall be supplied with factory installed motor starters (HE6X and HE8X 208-230/460V models are open drip-proof). Direct drive models (EV450 and HE1X models) shall be EISA-compliant for energy efficiency with open drip proof design and integral thermal protection.

N. Blowers shall be quiet running, forward curve type and be either direct drive (EV450 and HE1X only) or belt drive. HE6X and HE8X units use backward incline, belt drive blower packages. Belt drive motors shall be provided with adjustable pulleys and motor mounts allowing for blower speed adjustment, proper motor shaft orientation and proper belt tensioning.

O.

P. Extended-Surface, Disposable Panel Filters: Comply with NFPA 90A.

1. Filter-Holding Frames: Arranged for flat or angular orientation, with access doors on both sides of unit. Filters shall be removable from one side or lift out from access plenum.
2. Filter Type: Factory-fabricated, dry, extended-surface type.
3. Media Thickness: 2 inches
4. Arrestance (According to ASHRAE 52.1): 90 .
5. MERV (ASHRAE 52.2): 8.
6. Filter Media: Fibrous material formed into deep-V-shaped pleatsand held by self-supporting wire grid.
7. Media-Grid Frame: Galvanized steel
8. Mounting Frames: Welded, galvanized steel with gaskets and fasteners, suitable for bolting together into built-up filter banks.

2.2 AIR FILTERS

A. Air Filters: MERV rating of 8, as indicated on the drawings. Comply with requirements in specification Section 23 40 00, HVAC AIR CLEANING DEVICES.

2.3 OPTIONS

A. Provide double wall construction with 24-gauge galvanized steel liner.

B. Provide factory installed disconnect fuses.

C. Provide factory installed filter monitors for each airstream

PART 3 - EXECUTION

3.1 INSTALLATION

A. Follow the equipment manufacturer's instructions for handling and installation, and setting up of ductwork for makeup and exhaust air steamers for maximum efficiency.

B. Rotary Air-to-Air Exchanger: Adjust seals and purge as recommended by the manufacturer. Verify correct installation of controls.

C. Seal ductwork tightly to avoid air leakage.

D. Install units with adequate spacing and access for cleaning and maintenance of heat recovery coils as well as filters.

E. Brace heat recovery equipment installed in projects in the Seismic area according to specification Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS.

3.2 FIELD QUALITY CONTROL

A. Operational Test: Perform tests as per manufacturer’s written instructions for proper and safe operation of the heat recovery system.
   1. After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
   2. Adjust seals and purge.
   3. Test and adjust controls and safeties.

B. Replace damaged and malfunctioning controls and equipment.

C. Set initial temperature and humidity set points. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

D. Prepare test and inspection reports to the Senior COR in accordance with specification Section 01 00 00, GENERAL REQUIREMENTS.

3.3 INSTRUCTIONS

A. Provide services of manufacturer's technical representative for four hours to instruct VA personnel in operation and maintenance of heat recovery equipment.

END OF SECTION